

CLAIMS:

1. An electrophoretic display device (1) comprising:
an electrophoretic medium (40) comprising charged particles (8, 9);
a plurality of picture elements (18);
electrodes (5, 5') associated with each picture element and arranged to receive
5 drive signals (Dr); and
drive means (10) arranged to control the drive signals supplied to the
electrodes, which drive signals are provided to create a potential difference (VD) across each
picture element to bring the particles into a position corresponding to image information to be
displayed, the display device being characterized in that:
10 said drive means is further arranged to apply a second electric signal (Ne) to
the electrodes, which second electric signal decreases the ability of said particles to respond
to the drive signal.
2. The display device (1) according to claim 1, wherein the energy of the second
15 electric signal (Ne) is controlled by the drive means (10) such that said second signal does
not drive the particles (8, 9) into an extreme position near the electrodes (5, 5', 6).
3. The display device (1) according to claim 1 or 2, wherein the second electric
signal (Ne) is superimposed on the drive signal (Dr).
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4. The display device (1) according to any one of claims 1-3, wherein the
superimposed signal (Dr'+Ne') is arranged such that its polarity remains the same for the
complete duration of the second electric signal (Ne).
- 25 5. The display device (1) according to any one of claims 1-4, wherein the drive
signal (Dr) is distributed around the second electric signal (Ne).
6. The display device (1) according to any one of claims 1-5, wherein the second
electric signal (Ne) is applied during the second half of the duration of the drive signal (Dr).

7. The display device (1) according to any one of the preceding claims, wherein the second electric signal (Ne) is applied at the end of the duration of the drive signal (Dr).

5 8. The display device (1) according to any one of the preceding claims, wherein the second electric signal (Ne) comprises a sequence of pulses, in which sequence the polarity of the pulses is alternating.

9. The display device (1) according to claim 8, wherein the energy of a pulse in
10 the sequence is essentially equal to the energy of any other pulse in said sequence.

10. The display device (1) according to claim 8, wherein the amplitude of the pulses decreases with time.

15 11. The display device (1) according to any one of claims 8-10, wherein the drive means (10) removes any direct current component from the second electric signal (Ne) before applying it to the electrodes (5, 5').

12. A method of controlling gray level transitions in an electrophoretic display
20 device (1), the method comprising the steps of:

supplying a drive signal (Dr) to display device electrodes (5, 5') associated with each picture element (18) of the display device;

controlling the drive signal supplied to the display device electrodes such that the drive signal provided to each picture element creates a potential difference (VD) across
25 said picture element to bring charged particles (8, 9) of the display device into a position corresponding to image information to be displayed, the method being characterized in that it comprises the step of:

applying a second electric signal (Ne) to the display device electrodes, which second electric signal decreases the ability of said particles to respond to the drive signal.

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13. The method according to claim 12, further comprising the step of:

controlling the energy of the second electric signal (Ne) such that said second signal does not drive the particles (8, 9) into an extreme position near the display device electrodes (5, 5', 6).

14. The method according to claim 12 or 13, further comprising the step of:
superimposing the second electric signal (Ne) on the drive signal (Dr).
- 5 15. The method according to any one of claims 12-14, wherein the superimposed
signal (Dr'+Ne') is arranged such that its polarity remains the same for the complete duration
of the second electric signal (Ne).
- 10 16. The method according to any one of claims 12-15, further comprising the step
of:
distributing the drive signal (Dr) around the second electric signal (Ne).
- 15 17. The method according to any one of claims 12-16, wherein the second electric
signal (Ne) is applied during the second half of the duration of the drive signal (Dr).
18. The method according to any one of claims 12-17, wherein the second electric
signal (Ne) is applied at the end of the duration of the drive signal (Dr).
- 20 19. The method according to any one of claims 12-18, wherein the second electric
signal (Ne) comprises a sequence of pulses, in which sequence the polarity of the pulses is
alternating.
- 25 20. The method according to claim 19, wherein the energy of a pulse in the
sequence is essentially equal to the energy of any other pulse in said sequence.
21. The method according to claim 19, wherein the amplitude of the pulses
decreases with time.
- 30 22. The method according to any one of claims 19-21, further comprising the step
of:
removing any direct current component from the second electric signal (Ne)
before applying it to the display device electrodes (5, 5').